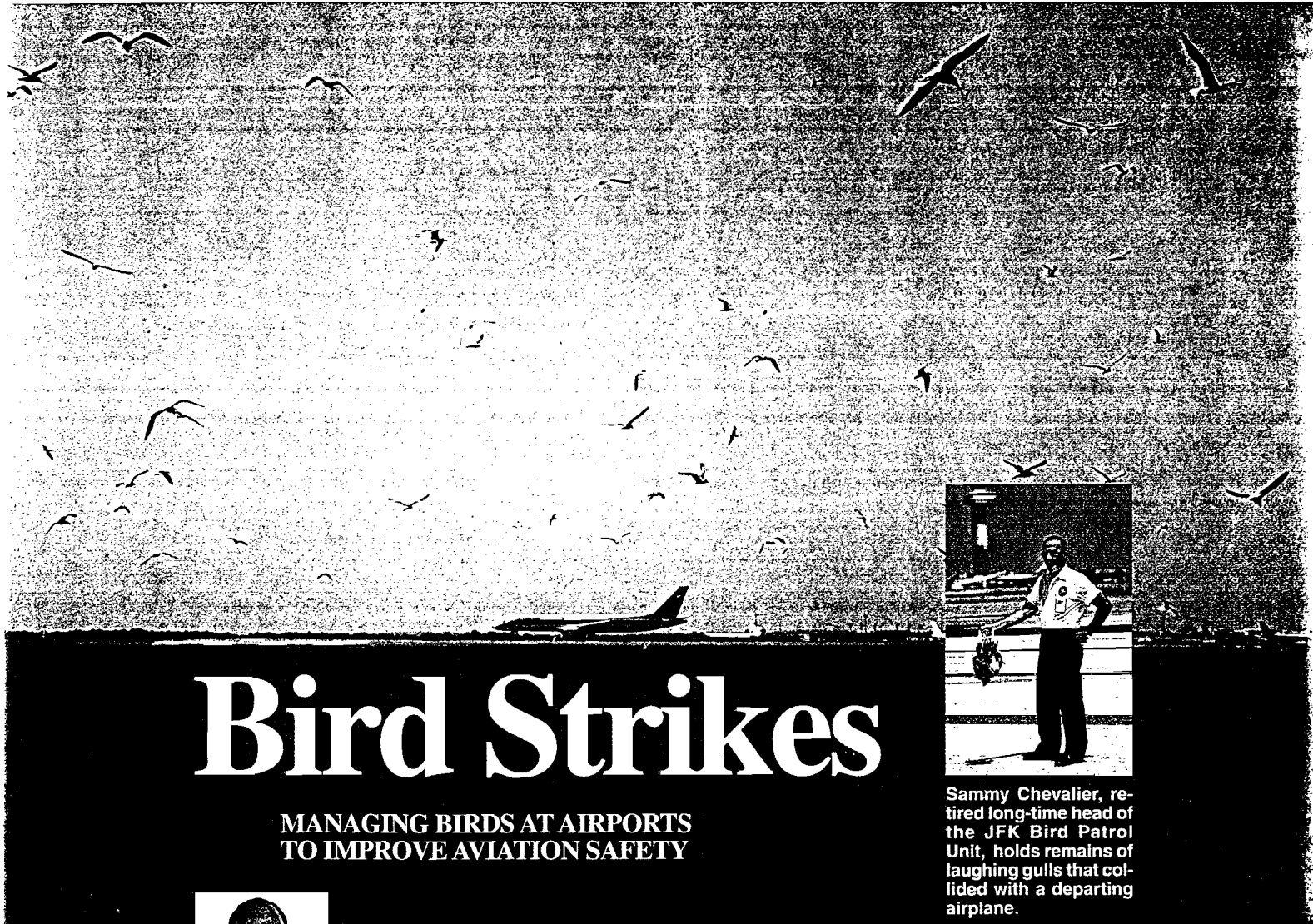


Airport managers throughout the world increasingly recognize that birds colliding with airplanes is a serious problem. For years the United States has lagged behind European countries in compiling data on bird collisions with airplanes and in appreciating the importance of wildlife

management programs to reduce the impact of bird activity on airports. But this attitude in the United States is now changing. An example of this increased awareness is at John F. Kennedy International Airport (JFK), located in a bird-rich environment alongside the marshes of Jamaica Bay, New York City. Personnel

indicates that 100 to 315 airplanes struck from 110 to 391 birds per year at JFK from 1979 to 1992. These are minimum estimates of strikes because pilots of large airplanes are often not aware they've struck a bird, and the remains of struck birds are not always recoverable. Nonetheless, these known strikes at JFK have



Bird Strikes

**MANAGING BIRDS AT AIRPORTS
TO IMPROVE AVIATION SAFETY**



Richard A. Dolbeer
Wildlife Biologist
Denver Wildlife
Research Center
U.S. Department
of Agriculture

from the Port Authority of New York and New Jersey have, in recent years, diligently recorded bird strikes on JFK runways by species of bird. This activity allows Port Authority personnel to clearly define JFK's bird problems and take appropriate management actions. The data

caused millions of dollars in damage to airplanes and represent a significant threat to human safety. From 1979 to 1993, bird strikes at JFK resulted in at least 51 aborted takeoffs and 46 damaged engines (31 required repair and 15 required replacement). Also from 1979 to



Sammy Chevalier, retired long-time head of the JFK Bird Patrol Unit, holds remains of laughing gulls that collided with a departing airplane.

1993, JFK averaged 270,000 airplane arrivals and departures, with more than 30 million passengers annually.

Strikes occur during both landing and takeoff phases of flight but pose more of a safety risk during takeoff. Two recent serious incidents involving heavily loaded Boeing 747 occurred in May 1991 and March 1992 at JFK after gulls were ingested into engines. The crew on one 747 aborted the takeoff and the airplane required replacement of brakes and 10 tires after a high-energy stop on the runway. The other 747 continued the take-off but jettisoned 200,000 pounds of fuel and returned safely to JFK.

Gull Populations

A nesting colony of laughing gulls (*Larus atricilla*) is adjacent to JFK in the marshes of Jamaica Bay Wildlife Refuge (see Figure 1). This refuge is administered by the U.S. National Park Service. The colony increased from 15 nesting pairs of gulls in 1979 to 7,629 pairs in 1990. At the same time, the number of airplanes striking laughing gulls increased (see Figure 2). From 1988 to 1990, 52 percent of the bird strikes at JFK involved laughing gulls; these bird strikes averaged 302 airplanes per year.

Other species of gulls involved in JFK bird strikes include herring gulls (*L. argentatus*), greater black-backed gulls (*L. marinus*), and ring-billed gulls (*L. delawarensis*). These three gull species comprised 35 percent of the strikes; another 52 species of birds comprised the remaining 13 percent. Almost all laughing gull strikes have occurred during daylight hours from May to September, peaking at the time of chick rearing in the adjacent wildlife refuge in late June and July. Laughing gulls fly over the airport from the colony to feeding and loafing areas throughout the metropolitan New York City area. After the nesting season, most New York laughing gulls fly to Central and South America for the winter.

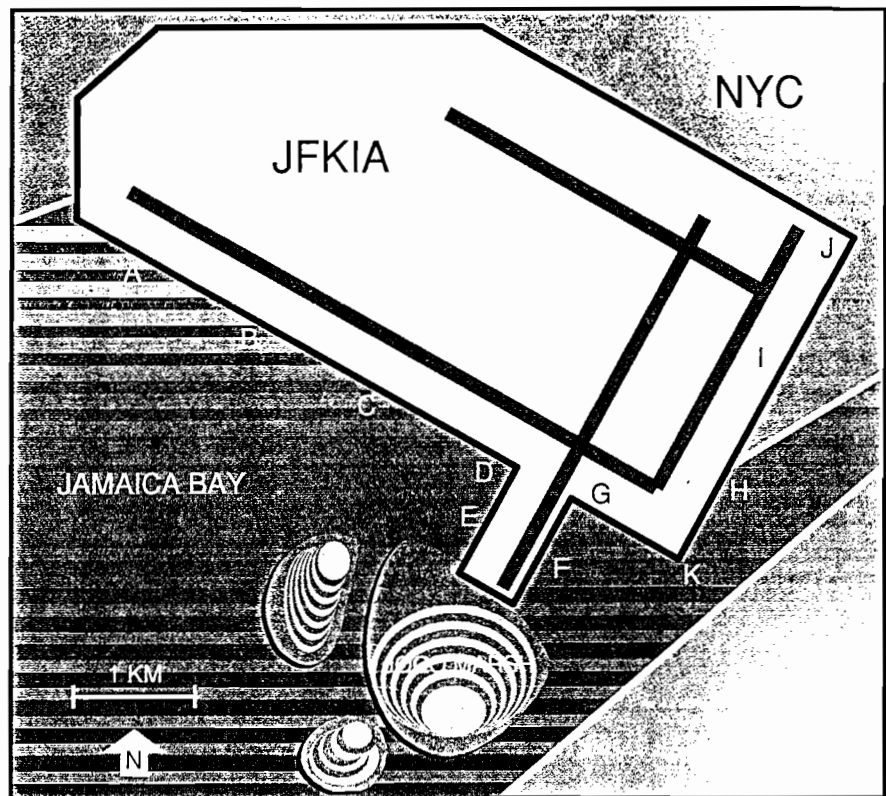


Figure 1. This map of John F. Kennedy International Airport shows the 11 shooting zones along the boundaries of the airport (A-K) and adjacent marshes in Jamaica Bay where laughing gulls nest. The shooting zones were part of a program to reduce the number of gull collisions at the airport.

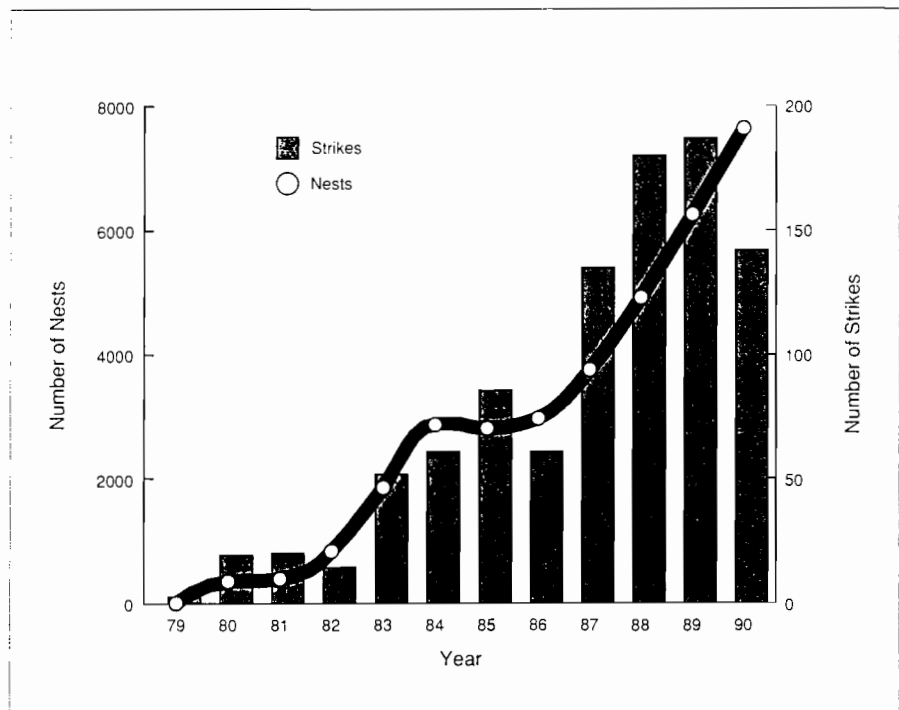


Figure 2. This chart shows the number of laughing gull nests in marshes of Jamaica Bay adjacent to JFK and the number of laughing gulls struck by airplanes at the airport from 1979 to 1993. The airport's shooting program to reduce gull collisions with airplanes was conducted in 1991 to 1993.

JFK is similar to many international airports in Europe and Canada in its approach to bird management. JFK has an active bird management program that incorporates habitat alteration, insect and garbage control, and a full-time bird patrol. The bird patrol uses various bird-frightening techniques to discourage birds from feeding, drinking, and loafing on airport grounds. These bird-frightening techniques include propane exploders, tape-recorded gull distress calls, and firecrackers fired from shotguns. The program at JFK even includes the use of a newly developed and environmentally safe chemical formulation containing methyl anthranilate (a grape flavoring), which repels birds from puddles of rain water on the airport. Many other techniques have been tried or considered, such as model airplanes and falconry.

JFK has a particularly difficult challenge in bird management not faced by many other airports because of the adjacent wildlife refuge. While the management

actions taken by JFK have been successful in discouraging gulls from using the airport grounds, these actions can do little to prevent gulls from flying back and forth over the airport from the protected nesting colony on National Park Service land to feeding sites beyond the airport.

Seeking Solutions

What could be done to solve this problem? From May to August in 1991 through 1993, U.S. Department of Agriculture wildlife biologists undertook an experimental program to reduce laughing gull and other gull strikes by airplanes at JFK. The program involved shooting gulls that attempted to fly over the airport. The hypothesis tested was that shooting would reduce the number of gull collisions with airplanes by directly reducing the population of gulls flying over the runways and by enhancing ongoing bird-frightening programs at JFK that condition gulls to avoid the airport. A further objective was to examine gulls

shot at JFK to determine the source and characteristics of this population.

Between two and five wildlife biologists were stationed among 11 shooting zones along the southwestern and southeastern airport boundaries where gulls crossed the airport (see Figure 1). The biologists used 12-gauge shotguns and #4 steel shot; they stood or sat in the open and wore blaze-orange vests. They directed shooting away from the airport and only at flying gulls within shooting range (about 40 yards). All shooters were professional biologists working under Federal and New York State permits issued to the U.S. Department of Agriculture. In the United States, all native birds, no matter how numerous, are federally protected by the Migratory Bird Treaty Act and can be killed only under special permit. Killing is only permitted when the birds are creating a serious economic, human health, or safety situation. Killing is only permitted when alternative methods are not available, and when the killing will not endanger regional populations of the problem species. Professional biologists carefully monitor any program using lethal control.

The Results

Did many gulls fly over the airport for the biologists to shoot? Did this shooting reduce the number of gull collisions with airplanes? The answer to both questions is a resounding yes! In 3,401 person-hours of shooting, the biologists shot 35,692 gulls (32,534 laughing gulls and 3,158 other gulls) in the summers of 1991 through 1993. The shooting program had a dramatic impact on the number of gull collisions with airplanes at JFK (see Figure 2). There was a 70 percent reduction in all gull strikes by airplanes during the 1991 shooting period when 53 gulls were struck. During the previous three years, the annual mean for gull strikes was 174. Gull strikes in 1992 and 1993 were reduced by about 89 percent, compared to 1988-1990 levels.

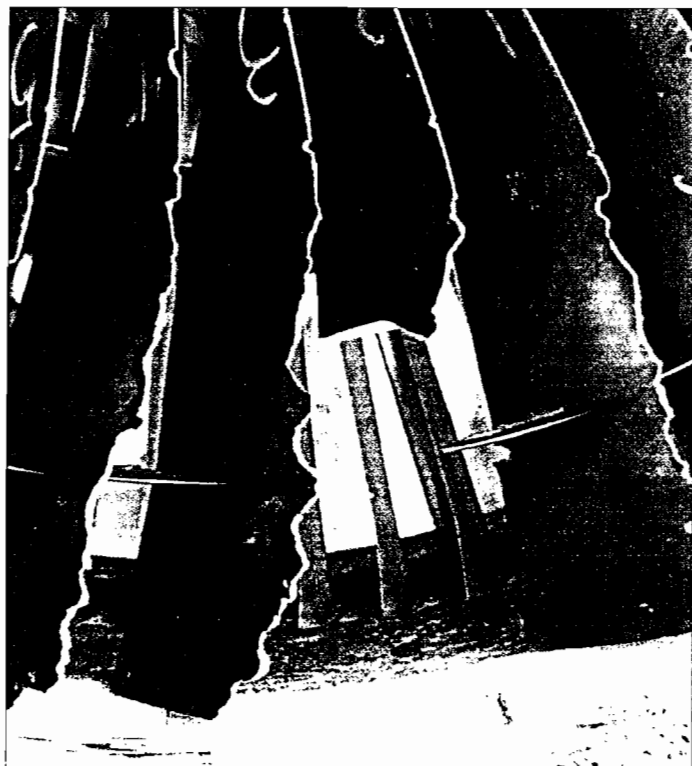


Photo shows engine damage due to an encounter with a bird.

Has the shooting program endangered the U.S. population of gulls or permanently solved the gull problem at JFK? The answer to both questions is no. It is true that the shooting program has removed more than 35,000 gulls and greatly reduced the strike level at JFK. However, the program has not had an imperceptible impact on the national population of gulls, nor has it reduced the size of the laughing gull nesting colony in Jamaica Bay by very much. A colony census in June 1993 revealed at least 6,000 pairs (12,000 adult gulls) still nesting next to the airport. Studies of gull movement patterns and population dynamics, based in part on gulls with numbered leg bands, indicate that gulls from expanding colonies in New Jersey and elsewhere are immigrating to Jamaica Bay to replace the shot gulls. Laughing gulls are abundant along the Atlantic and Gulf coasts and the shooting program has affected less than one percent of the national population. Thus, while the shooting program has been very effective in reducing strikes, results to date suggest that the program will have to be continued annually to remain effective.

Conclusions

What are the options for managing this problem in the future? A preferred long-term solution may be to disperse the colony from its protected refuge in Jamaica Bay and away from JFK. The problem is not one of too many laughing gulls along the Atlantic coast; it is a problem of too many laughing gulls nesting next to JFK. Just as it is unwise to allow garbage dumps to operate next to airports because these sites attract birds, gulls

should not be allowed to nest next to airports, either. A dispersal plan for the colony could include habitat alteration, nest destruction, and other non-lethal harassment and management techniques at the colony site in the marshes.

What other research programs are underway to resolve bird problems at airports? Although this article has focused on work at JFK, many airports throughout the world have bird and other wildlife problems. The U.S. Department of Agriculture, through an interagency agreement with the Federal Aviation Administration, currently is conducting research in three areas of concern:

- Habitat management on and around airports to minimize attractiveness of airports to wildlife.
- Bird use of waste disposal facilities near airports.
- The development and evaluation of wildlife repellent and frightening techniques. For example, development of a chemical repellent for keeping birds out of puddles of water at airports.

The management of vegetation on airports to prevent insect outbreaks that attract flocks of feeding birds and the development of techniques to discourage gulls and other birds from nesting next to airports are other examples supporting the research. By using the scientific principles of wildlife management, we can minimize the need to kill wildlife while improving the economics and safety of air transport operations.

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FOR MORE INFORMATION

If you'd like additional information on wildlife management at airports, contact one of the following three organizations that deal with this issue:

Bird Strike Committee USA, James Forbes, Chairman. U.S. Department of Agriculture, P. O. Box 97, Albany, New York 12201-0097, USA. (518) 472-6492

Bird Strike Committee Canada, D. J. Fairbairn, Chairman. Environmental Services, Airports Group, Transport Canada, Tower A, Place de Ville, Ottawa, Ontario K1A 0N8, Canada. (613) 990-1402

Bird Strike Committee Europe, John Thorpe, Chairman. Civil Aviation Authority, Aviation House, Gatwick Airport, West Sussex RH6 0YR, England. (44+293) 573225